Action were discussed. Applicants now submit the amendments and arguments presented during the interview for the Examiner's full reconsideration.

By the foregoing Amendment, independent Claims 1, 5, and 9 are sought to be amended. Claims 2, 6, and 10 are sought to be cancelled without disclaimer or prejudice. These changes are believed not to introduce new subject matter, and their entry is respectfully requested.

Based on the above Amendment and the following Remarks, Applicants respectfully request that the Examiner reconsider and withdraw all outstanding rejections.

I. Rejections of Claims under 35 U.S.C. § 112, Second Paragraph

The Examiner has rejected Claims 2-12 under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Applicants have amended the claims in those instances where the specific terms "Panasonic Model D350", "Storage Technology Corporation Model 4400", "4400 automated cartridge system", and "3480-style cartridge" were used. As discussed during the interview, Applicants maintain both that these specific terms clearly and definitively delineate the scope of present invention and that such usage is fully supported by the prevailing law. (*See*, Response and Amendment filed July 7, 1994 (hereinafter, "First Response"), pages 3-4). Applicants, however, have amended the claims with generic terms to accommodate the rejections and further the prosecution of the present application.

In particular, all specific references to model "4400" in Claim 5 have been replaced with the generic term "automated cartridge system". In Claim 9, all references to a "3480-style cartridge" have been replaced with the term "single reel tape cartridge". (*See*, Specification, page 4, lines 19-20; page 12, lines 15-30; U.S. Pat. Appl. Ser. No. 07/870,576, titled "Magnetic Tape Cartridge for Helical Scan Transport"). Claims 2, 6, and 10 which recited "Panasonic Model D350" have been cancelled without disclaimer or prejudice.

Accordingly, Applicants submit that the rejections have been either properly accommodated or rendered moot by the Amendment and respectfully request reconsideration and withdrawal of the rejections.

II. Rejections of Claims under 35 U.S.C. § 103

The Examiner has rejected Claims 1-12 under 35 U.S.C. § 103 as being allegedly unpatentable over U.S. Patent No. 4,991,037 to Shimizu *et al.* (hereinafter, "Shimizu") in view of U.S. Patent No. 4,399,959 to Godsoe *et al.* (hereinafter, "Godsoe") and further in view of the three U.S. patents to Moy *et al.* (hereinafter, "Moy") incorporated by reference in the Specification. The following remarks pertain to the now pending independent Claims 1, 5, and 9 and correspondingly to Claims 3-4, 7-8, and 11-12, which depend therefrom.

Applicants respectfully traverse these rejections. As discussed in the interview and presented in the First Response, Applicants respectfully maintain that the present invention *as a whole* is neither taught nor suggested by the five cited patents individually, or any combination thereof. (*See*, First Response, pages 5-7). In summary, the present invention teaches a *helical scan transport* with a *form factor* (*i.e.*, physical dimensions and layout) compatible with that of conventional longitudinal transports currently used with the Storage Technology Corporation 4400 Automated Cartridge System. (*See*, Specification, page 5, lines 13-20). *Form factor* compatibility a prominent feature of the present invention. That is, the storage capacity of existing systems can be increased by approximately 100 fold by merely replacing conventional transports with *helical scan transports*. Thus, the present invention can transform the typical automated cartridge system with a total capacity of 1.2 terabytes into a 150 terabytes memory system at minimal cost.

In searching for a cost-effective solution, Applicants first recognized the advantage of leveraging existing technology, including the use of commercially available helical decks (*e.g.*, Panasonic D350). While helical decks have been used extensively in the video industry, the technology had yet to be exploited in the data processing industry. (*See*, Specification, pages 2-3). Applicants then were confronted with a series of problems in conforming the transport to *form factor* requirements. That is, if the invention were to be

truly a flexible and cost-efficient solution, Applicants had to utilize as many commercially available components as possible and integrate them within the confines of the *form factor*.

To reflect the cost-effectiveness of the present invention realized by teaching the use of commercially available components, Claim 9, as amended, recites a *helical scan transport* which includes a *video tape recorder helical deck* for reading/writing a *single reel tape cartridge* with a *substantially linear tape loading path*. As discussed in the interview, Applicants submit that the art of record neither teaches nor suggests the combination of these features or the advantage of leveraging existing helical technology for transport systems.

Furthermore, the present invention teaches a number of additional features which are attributable to achieving the required *form factor*. As suggested by Examiner Tupper, the independent Claims 1 and 5 have been amended to more distinctly point out these features and distinguish the art of record. Claims 1 and 5 recite a helical scan transport for a tape cartridge having an elevator assemble, a helical deck and a *raised linear treading mechanism* arranged in such a fashion to achieve a substantially linear tape loading path to achieve the required *form factor*. By the foregoing Amendment, these claims have been amended to further point out the features of the *raised linear threading mechanism* which generally includes a *linear bearing*, a *threading arm*, and a *threading cam*. (*See*, Specification, page 5, lines 7-10; page 10, lines 21-27; Figures 6 and 7, elements 218, 226, 228, and 230; U.S. Patent No. 5,333,810 to Hoge *et al.*)

Although conventional transports (single reel) teach various mechanisms for threading the tape loading path for a longitudinal magnetic head, these threading systems could not be utilized with the present invention. These conventional threading mechanisms generally entail a rather straightforward one step process of engaging and threading the tape leader block past the magnetic head to a take-up reel. Once this step is completed, the tape can then be read/written. The cited art teaches two methods of threading the tape in a longitudinal transport (*i.e.*, longitudinal magnetic head). In Shimizu system the tape cartridge 14 and the take-up reel 94 are disposed in a closely adjacent arrangement. Shimizu teaches the use of a pivoting arm mechanism (first and second driving arms 76,81) to pull a leader block 39 from a tape cartridge 14, across two guideposts 45 and a magnetic head 44, into a take-up reel 94. (*See*, Shimizu, Figures 1, 2(D)-(E)). The Shimizu pivoting arm

mechanism threads the tape across the guideposts and magnetic head in a sweeping arc like fashion.

Godsoe, in contrast, teaches the use of channel 40 deposited within a relatively linear threading path. A pin 42, driven by a constant force spring 48, travels through the channel 40 pulling a leader block 18 across two air bearing tape guides (31,34) and a magnetic head 32 to a take-up reel 28. (*See*, Godsoe, columns 2 and 3; Figures 1 and 2).

The threading path of a helical scan deck, in contrast, requires a more complicated two step process to load the tape before reading/writing data. First, the tape must be threaded through the load path which entails interweaving the leader block between a series of tightly arranged guideposts to the take-up reel. Second, the tape is wrapped partially (forming semi-circle loop) around the magnetic head.

For example, consider helical scan deck of the preferred embodiment (*i.e.*, the Panasonic D350). Helical scan deck 216 includes a magnetic scan head 222, a loading ring 224, and a plurality of guideposts (A-H) along the tape path (338). (*See*, Specification, page 13, lines 17-28; Figures 7-8 and 11). The linear threading mechanism 218 of the present invention must pull the leader block between guideposts A and B; over guideposts C-E; between guidepost H and F-G; and into take-up reel 236. Guideposts E and F are mounted on loading ring 224 and move therewith to load the tape around helical head 222 for data read/write operations. Once the threading operation is complete, control is transferred to the helical scan deck 216 for loading the tape around head 222 by means of guideposts E and F of the loading ring 224.

To accommodate both the inherently intricate loading path of helical scan decks and the rather oblong rectangular (approximately 12.5" x 11" x 26.5 ") *form factor* of the transport, Applicants developed the *raised linear threading mechanism*. As recited in the claims, the *raised linear threading mechanism* generally includes the *linear bearing* 226, the *threading arm* 228, and the *threading cam* 230 positioned on a platform above the helical scan deck 216. In operation, the *threading arm* 228 grasps the tape leader block from the cartridge and is pulled by the *linear bearing* 226 to the take-up reel 236. As the *threading arm* 228 travels along the tape path, a spring loaded threading pin (not referenced in the Figures) follows the *threading cam* 228. As the threading pin is pulled along the profile of the *threading cam,* the tape is interwoven between the guideposts of the helical scan deck.

Applicants respectfully submit that the art of record neither teaches nor suggests the *raised linear threading mechanism* of the present invention. Furthermore assuming, *arguendo*, that one of ordinary skill would have tried to apply the cited art as suggested by the Examiner. Applicants submit that any such efforts would have been unsuccessful for several reasons.

First, the Shimizu pivoting arm threading mechanism (as well as conventional jointed-arm mechanisms) could not have been used due to their inability to thread the tape within the required *form factor* (*i.e.*, the width of the transport). Such threading arms rotate about a fixed point outside the tape path and have an arm length which is proportional to the length of the threading path (thus a great deal of space is required to allow for the pivoting motion). Correspondingly, the Shimizu arm length increases as the distance between the supply and take-up reels increases (an increase in the tape path). While *form factor* dictates a considerable long threading path (along the depth of the transport, 28.26"), it only allows for a disproportionally narrow width (12.5"). With such requirements, Shimizu threading mechanism or any variation thereof could not have been used. That is, the arm length necessary to transverse the considerably long threading path would clearly exceed the width requirements of the transport. The present invention, in contrast, circumvent the wasted space and motion associated with the conventional pivoting arm mechanisms by replacing pivot point with the linear bearing 226.

Furthermore, since Shimizu uses a sweeping motion, the tape path has to be relatively smooth and arcuate. Such a limitation prohibits use with the helical scan deck in the *form factor* of the present invention because the tape must be routed through the guideposts in a rather circuitous manner, as discussed above.

Godsoe has similar limitations. While Godsoe does teach a relatively linear threading mechanism, such a system requires use of a channel which is substantially in the same plane as the guideposts and magnetic head. Such an arrangement could not be used because the Godsoe channel and the drive mechanism would interfere with the base plate of the helical deck.

For at least these reasons, Applicants submit that independent Claims 1, 5, and 9 and Claims 3-4, 7-8, and 11-12 dependent thereon are patentable over the art of record. Reconsideration and withdrawal of the rejections is respectfully requested.

Conclusion

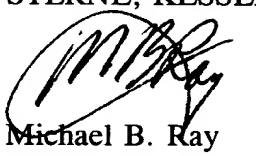
Claims 1, 3-5, 7-9, and 11-12 are presented to the Examiner for reconsideration. Applicants believe these claims to be allowable based on the Amendment and Remarks set forth above, and favorable consideration is respectfully solicited.

All of the stated grounds rejection set forth by the Examiner in the final Office Action have been either properly accommodated, traversed, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider and withdraw all presently outstanding rejections.

The Examiner is courteously invited to telephone the undersigned representative if it is felt that an additional interview may be useful for any reason.

Respectfully submitted,

STERNE, KESSLER, GOLDSTEIN & FOX



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